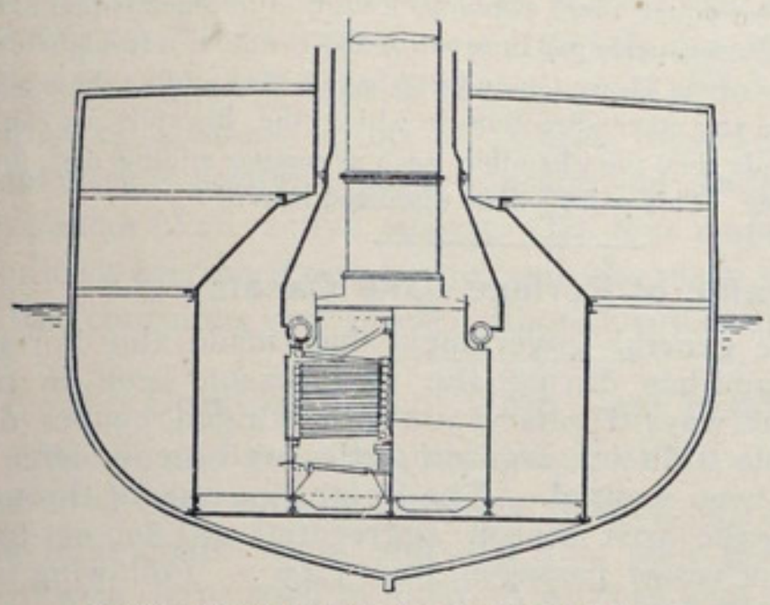
MARINE REVIEW.

VOL. VI. CLEVELAND, OHIO, THURSDAY, DECEMBER 22, 1892. No. 25.

Steam Generators for the Great Northern Passenger Boats.

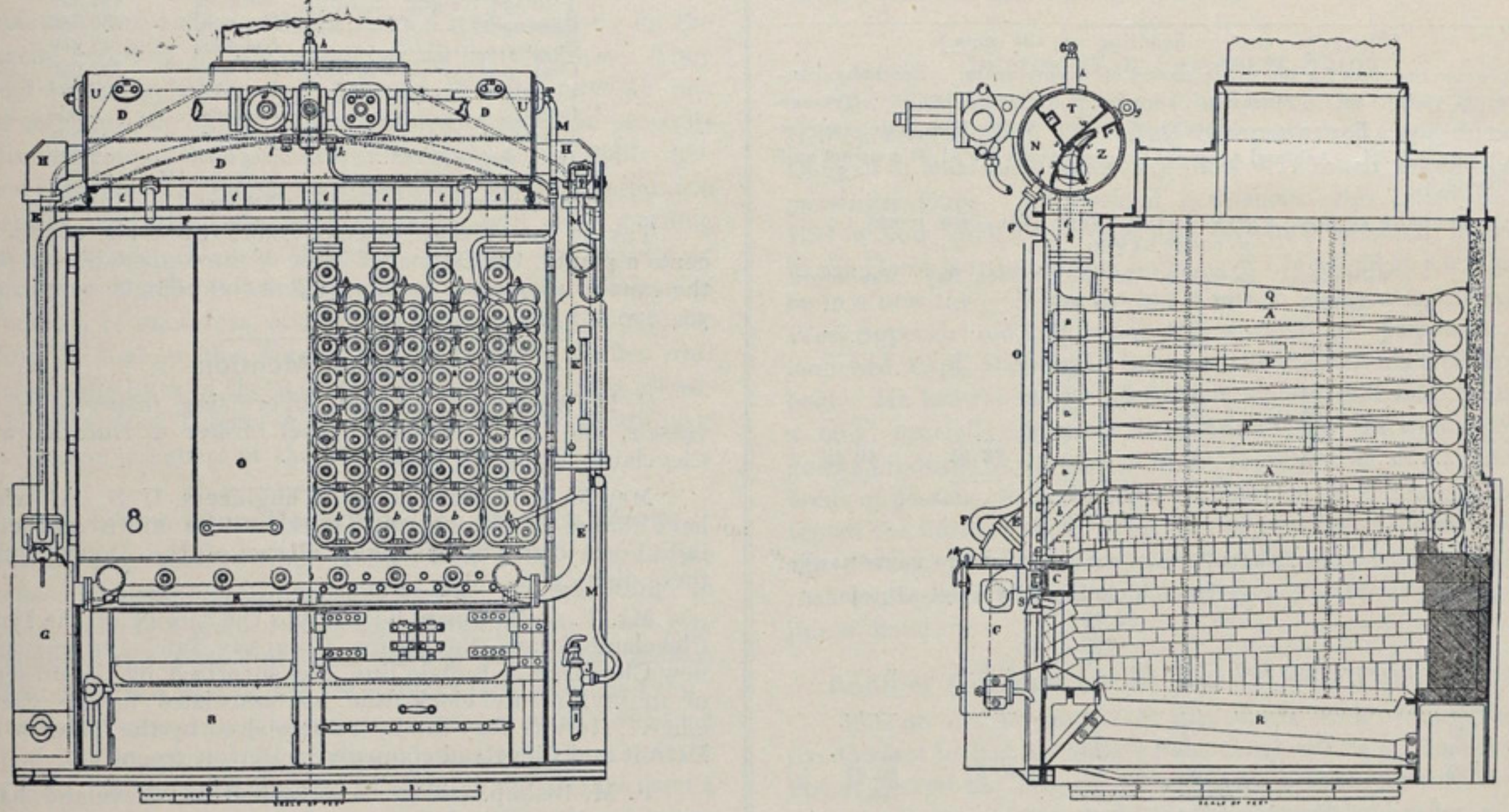
The announcement that each of the big passenger boats under construction at the yard of the Globe Iron Works Company, Cleveland, for the Northern Steamship Company, is to have twenty-eight Belleville boilers has created a great deal of interest in this type of steam generator which is new in its application to large vessels in this country and entirely new to the lakes. Some drawings reproduced here will serve to show the main features in the construction of these boilers as well as their arrangement in vessels to which they are applied. The small drawing, a transverse section from a French vessel in which these generators are used, shows boilers, fire room and bunkers. The boilers are set back to back directly over the keel line of the hull, the fire rooms are outboard on each side, as shown, and the bunkers are between them and the outside of the hull. Thus in each of the new Northern line boats there will be fourteen boilers on either side of the keel about amidships, with furnaces working into three stacks. The twenty-eight generators are divided into three groups, ten in the forward fire hold, eight in the middle hold and ten in the after hold. These fire holds will be separated by heavy bulkheads, so that in case of accident of any kind in any of the different compartments the operation of any of the three groups of generators can be suspended without serious results.



Section showing boilers, fire rooms and bunkers.

In this peculiar arrangement there is evident practical advantage to the ship in the better distribution of weights as well as better distribution and coal stowage. The fire rooms being outboard of the boilers and the bunkers again outboard of the fire rooms, these latter are cool and well ventilated, as only one side is exposed to the heat. Not only are the attendants in a better temperature with good air to breathe, but the handling of coal by the firemen is from the bunker direct to furnace, for each fire door has its own coal opening in the bunker directly opposite and within shovel-reach. The boilers will be constructed at the shops of the Globe Iron Works Company under the direction of Mr. Miers Coryell, who is the agent of the Belleville company in this country.

Now that the Cramps have decided upon quadruple expansion engines for all of the new Inman line steamers, it will be seen that the builders of these boats, as well as Mr. John Gordon, general manager of the Northern Steamship Company, are really in advance of the best practice for high power passenger steamers in the radical departures which they have undertaken. On Jan. 1 of last year Belleville boilers were in use in vessels aggregating more than 100,000 horse power, some of which in the merchant service between France and Australia are subjected to continuous steaming of twenty-two days.



BELLEVILLE BOILER, TO BE USED IN GREAT NORTHERN STEAMERS.

Great preparations are being made at St. Paul and Seattle to celebrate the completion of the Great Northern Railway to the Pacific coast. The demonstration will surpass that over the completion of the Northern Pacific. The two new steamers building by the Globe Iron Works Company, in connection with the four that will follow, will cover the water route link in this great trans-continental system.

Some Average Rates of Lake Freights.

Average rates of freight on ore, coal and grain presented in the following tables are in all cases taken from the best possible sources of information. In the case of ore from Ashland, for instance, the average is made up from the daily charters of two or three brokers and shippers doing most business from that port. The same is true of all rates on coal. Where figures on coal from shippers are used, the average is not that obtained from bulking contract coal with that shipped at going rates. The figures represent the average of rates ruling from day to day throughout the season :

AVERAGE FREIGHT RATES, IRON ORE, PORTS NAMED TO OHIO PORTS.

Year.	ESCANABA.		MARQUETTE.		ASHLAND.	
	"Wild" Rate.	Contract Rate.	"Wild" Rate.	Contract Rate.	"Wild" Rate.	Contract Rate.
1873	$2 59	$2 60	$3 53	$3 50	.....	.....
1874	1 36	2 00	1 93	2 75	.....	.....
1875	1 13	1 40	1 50	1 75	.....	.....
1876	86	1 20	1 35	1 50	.....	.....
1877	98	1 00	1 41	1 40	.....	.....
1878	81	90	1 22	1 30	.....	.....
1879	1 25	90	1 83	1 40	.....	.....
1880	1 70	1 85	2 26	2 75	.....	.....
1881	1 36	1 75	2 05	2 45	.....	.....
1882	1 04	1 40	1 26	1 75	.....	.....
1883	1 22	1 00	1 40	1 20	.....	.....
1884	87	1 10	1 08	1 35	.....	.....
1885	78	90	98	1 05	1 25	1 15
1886	1 28	1 05	1 51	1 20	1 78	1 20
1887	1 59	1 40	1 87	1 63	2 23	2 00
1888	1 05	90	1 30	1 15	1 43	1 25
1889	1 01	1 00	1 19	1 10	1 34	1 25
1890	89	1 10	1 07	1 25	1 17	1 35
1891	84	65	1 02	90	1 11	1 00
1892	74	1 00	98	1 15	1 15	1 25

[Charge to vessel for handling ore, 19½ cents.]

Average ore rates for the entire period of twenty years: Escanaba, contract $1.25, "wild" $1.17; Marquette, contract $1.62, "wild" $1.53. Average for past ten years: Escanaba, contract $1.01, "wild" $1.03; Marquette, contract $1.20, "wild" $1.24. Ashland averages for eight years are $1.30 contract and $1.43 "wild."

AVERAGE FREIGHT RATES, "WILD," SOFT COAL, OHIO PORTS TO PORTS NAMED.

Year.	Milwaukee.	Escanaba.	Duluth.	Green Bay	Manitowoc.
1885	$0 63	$0 51	$0 49	.....	.....
1886	83	60	78	.....	.....
1887	1 06	72	89	.....	.....
1888	84	61	66	.....	.....
1889	54	49	52	.....	.....
1890	64	45	49	.....	.....
1891	61	52	49	.....	.....
1892	58	43	43	$0 55	$0 49
Average eight years	72	54	59		

AVERAGE FREIGHT RATES, "WILD," HARD COAL, BUFFALO TO PORTS NAMED.

Year.	Chicago.	Duluth.	Milwaukee.	Toledo.
1885	$0 71	$0 52	.....	.....
1886	87	62	.....	.....
1887	1 05	70	.....	.....
1888	86	65	.....	.....
1889	52	41	.....	.....
1890	62	43	.....	.....
1891	56	29	.....	.....
1892	59	43	$0 57	$0 27
Average eight years...	72	49		

[Coal shipped net tons; handled without charge to vessel.]

AVERAGE FREIGHT RATES, GRAIN, CHICAGO TO BUFFALO.

Year.	Wheat.	Year.	Wheat.
1878	3.1 cents.	1887	4.1 cents.
1879	4.7 "	1888	2.7 "
1880	5.7 "	1889	2.5 "
1881	3.2 "	1890	1.9 "
1882	2.5 "	1891	2.5 "
1883	3.5 "	1892	2.2 "
1884	2.1 "		
1885	2. "	Average, fifteen years	3.1 cents.
1886	3.6 "		

[Handling charge to vessel on grain, $3.50 to $4.00 per 1,000 bushels.]

Comparing Chandler and Mesaba Ores.

In his latest publication regarding the Mesaba range, Horace V. Winchell says : "In 1891 the Chandler mine of the Vermillion range produced 354,993 tons of Chandler ore and 20,873 tons of Long Lake ore. The entire product of this mine is Bessemer. In some respects this is the greatest mine in the world. Occupying but eighty acres, its production for 1892 will be nearly 650,000 gross tons of remarkably uniform ore. Cargo after cargo is sampled at Cleveland that will not vary half of 1 per cent. in iron content. Under the able direction of Joseph Sellwood, the cost of mining has been reduced to less than $1 per ton on this ore, providing it brings $4.85 at Cleveland, as it is said to have done in 1892. This estimate is based on the following details: Cost of mining, $1; royalty, 35 cents; railroad freight to Two Harbors, $1; lake freight to Cleveland, $1.20; insurance, commission, etc., 25 cents; total, $3.80. These figures are approximate and are given merely for the sake of indicating the entire feasibility of mining at a profit on the Mesaba, where the cost of mining will be considerably less than at the Chandler, with higher royalties. The average of the analyses given of the Biwabik ore indicates that in quality it is nearly equal to the Chandler ore. If the expense of placing it on the car, including royalty, were equal, there would be a slight difference (equal to the freight from Ely to Tower, perhaps) in favor of the Biwabik. It might even be possible to sell the ore at $4 per ton and still have a nice profit. If in addition to this there are any other directions in which the Biwabik ore can be produced more cheaply than the Chandler, such as smaller mining cost, there is so much more profit. This point will be discussed later."

Traffic of Portage Lake Canals.

Now that the general government has made the Portage lake canals free, and has during the past season been in full charge of the waterways tributary to the Michigan copper district, some reliable statistics regarding the water commerce of the district have been secured. The freight movement through the canals during the past season aggregated 484,899 net tons and the number of vessel passages was 1,430. Following is a full statement of the traffic:

Items.	Designations.	Season of 1892.
Vessels, steam	Number	1,118
Vessels, sail	Number	312
Tonnage, freight	Net tons	484,899
Passengers	Number	30,086
Copper	Net tons	46,910
Coal	Net tons	221,689
Flour	Barrels	127,024
Corn	Bushels	2,004
Wheat	Bushels	15,824
Iron, manfactured	Net tons	2,597
Lumber	M feet B. M.	27,196
Miscellaneous merchandise	Net tons	101,644

Taking the average price of Lake Superior copper at 12 cents a pound, the estimated value of the copper shipped through the canals, 46,910 net tons or 93,820,006 pounds, would be $11,584,000.

Personal Mention.

C. H. Westcott of Detroit, supervising inspector of steam vessels, and H. B. Earhart, vessel broker of Duluth, were in Cleveland during the week.

Maj. M. B. Adams, corps of engineers, U. S. A., who is to have charge of engineering work in the ninth and eleventh light-house districts, has taken charge of the Detroit office for these districts.

Mr. T. F. Newman, who leaves the service of the Detroit & Cleveland Steam Navigation Company Jan. 1, to manage the new Cleveland & Buffalo line, was surprised by the presentation of an onyx mantel clock from his associates in the Cleveland office. He was very kindly remembered by the officers of the Detroit and Cleveland company in Detroit recently.

F. M. Bishop, said to be a resident of Cleveland, has been corresponding with the mayor of Sault Ste. Marie, Mich., in regard to the establishment of a dry dock and ship building plant at that place. Mr. Bishop is undoubtedly a stranger among men in the ship building industry on the lakes. A diligent inquiry in Cleveland fails to elicit any information regarding his connection with the business.

Mr. W. L. Churchill of Alpena, Mich., has worked several years to have wages of life saving crews advanced, and passage of a bill to that effectby last congress was partly due to his efforts. Lake life saving crews appreciated his work and contributed for the purchase of a handsome cane, which was presented to him at a banquet last week, the keepers and crews of Middle and Thunder bay island stations being present. Arrangements were made to include in a banquet next year all the crews from Ottawa point to Hammond's bay.

Send 50 cents in stamps to the MARINE REVIEW for 14 phototypes and gravures of lake steamers neatly bound.

No Talk of Season Contracts.

In some previous years contracts for carrying iron ore have been made as early as December, and very often immediately after the time of holding annual meetings in January. Present conditions in the iron market can not be said to be against early contracts, but the most serious draw-back is the probability of differences between furnace men and ore dealers regarding prices, on account of uncertainty as to the output of ore from the new Mesaba range. Furnace men will expect low prices as a result of the opening up of this range, and may delay their purchases until some time after the opening of navigation, unless ore dealers submit to a marked reduction in prices. Ore dealers are of the opinion that the influence of Mesaba ore on the market for the first season has been over-estimated, and will probably delay sales rather than dispose of their product at low prices. A large volume of business in ore is assured, however, and stocks of grain already accumulated at Chicago and Duluth are additional assurances of an active season. In four months stocks of pig iron have decreased one-fourth, and the make and consumption of iron continues very heavy, although prices are low.

Combination of Ohio Coal Producers.

For several years past coal dealers of the Hocking Valley district of Ohio and the Pittsburg district in Pennsylvania, who ship large quantities of soft coal from Ohio ports by lake to the northwest, have tried in different ways to pool their interests, so as to overcome competition, which, it is claimed, has kept the margin of profits below a reasonable basis. An agreement made last year was lived up to for only a short period, and now the Ohio operators are endeavoring to form a trust company for the commercial handling of the output of all their mines. They have held several meetings and propose to turn over to one general company the output of their mines for sale, the proceeds to be divided among the operators according to an equitable rule. The new company will employ all traveling men and attend to all contracts, and the individual operators will have nothing whatever to do with the sale of coal. Some of the results of this arrangement will be the discharge of a number of salesmen in the employ of operators, and a large reduction in the expense of placing the coal on the market. The Hocking Valley operators along the lines of the Baltimore & Ohio, Columbus, Shawnee & Hocking and Toledo & Ohio Central railroads, are, it is said, to become members of the new trust company.

Valuable Information Regarding the Mesaba Range.

We have just received from Horace V. Winchell one of the first copies of a pamphlet of 60 pages on the "Mesaba Range in Minnesota," giving a history of recent developments and a general account of the method of occurrence of ores, their quality, etc. The work is a part of the "Minnesota Geological Survey," and is the most complete description of the Mesaba range yet published. It comprises numerous analyses of nearly all of the ores of mines on the older ranges, as well as the Mesaba, and a description of properties already opened on the latter range. Although a part of the Geological Survey of Minnesota, the expense of printing this pamphlet is borne by the author, who also published some time ago a volume of 430 pages on the "Iron Ores of Minnesota." The two reports can be secured through the MARINE REVIEW at $3.50, the cost of the first publication.

Quantity of Ore on the Mesaba.

Hardly a week passes now without the announcement of a new find, and new areas are continually being tested and found productive on the properties already under development. The number of known merchantable deposits already exceeds twenty and many other promising localities have not yet been explored. It is evident that there is ore in store for many years to come, and that permanent investments and improvements of the most extensive nature can safely be made, based on an expectation of the sufficiency and quality of this ore supply. Contracts have been made calling for a minimum production of one and a half million tons per annum. This is more ore than has ever been produced by the Vermilion range in one season, and is about one-sixth of the entire Lake Superior product. The yield of some of the largest mines, like the Mountain Iron, McKinley and Lake Superior, is not included in this minimum figure, nor are some others like the Canton, Kanawha and Great Western. It is moreover likely that some companies will ship more than their minimum amount. It may not be within the first two years, but after they are quite ready.—H. V. Winchell in the "Mesaba Iron Range."

Republic Iron Company.

In justice to the management of the Republic Iron Company it is only fair to state that the report of the special meeting of stockholders on the 14th inst., printed in the last issue of the REVIEW, was not furnished by any of the officers of the company. It was prepared from information gathered from two or three stockholders of the company. We find that an impression has gone out that the report regarding the condition of the Republic mine, from which abstracts were published, was secured from the office of the company. Such was not the case, however, and our information regarding this meeting, as in the case of most other meetings of Lake Superior mining companies, which are considered private corporations, was obtained from stockholders outside of the board of directors, the latter refusing to give as much detail as was printed.

Interested in Passenger Ships.

Two distinguished leaders in affairs on the lakes, James J, Hill of the Northern Steamship Company and Capt. Alex McDougall of whaleback fame, are now very much taken up with passenger ships. A Cleveland gentleman who called on Mr. Hill in New York a few days ago says he is as much interested in the Great Northern boats building at Cleveland as a boy would be in a new toy. After the big Chicago delegation arrived at West Superior too late to see the world's fair passenger boat launched, Capt. McDougall interested them with his model of the boat. He had the model taken from a glass case and floated in a tank, specially prepared for it, and then to the wonder of the guests produced small bars of brass, representing in weight hundreds of passengers in the same proportion as the model represented the finished ship. The bars of brass were placed on one side of the deck of the small vessel in the water, to show that a rush of passengers to either side would not materially change the line of flotation.

Another Contract for St. Mary's Falls Canal Work.

Bids on another important part of the work of constructing the 800-foot lock at St. Mary's Falls canal will be opened by Gen. Poe at Detroit on Jan. 12. The contract to be let will include the construction of floor, culverts, breast-walls and miter sills of the lock, and the specifications give the following approximates of material and work: Portland cement, 4,000 barrels; natural cement, 9,000 barrels; white pine timber to be laid, 3,421,572 feet, broad measure; white oak timber to be laid, 15,400 feet, broad measure; iron, 1,143,272 pounds; material to be excavated, 6,000 cubic yards; concrete to be laid, 10,000 cubic yards; holes to be drilled, 67,500 linear feet. Work under the contract, shall be begun on or before May 15, 1894, and entirely completed on or before Dec. 15, 1894, but prior to Nov. 16, 1893, must not interfere in any way with the execution of the existing contract with Messrs. Hughes Bros. & Bangs for masonry construction.

A large number of subscriptions expire with the new year. Send in renewals and avoid having name cut off.

CHICAGO LAKE INTERESTS.

WESTERN OFFICE, MARINE REVIEW,
No. 13 Western Union Building, CHICAGO, Ill., Dec. 22.

J. Stanley Morton of the Graham & Morton Transportation Company, running between Chicago and St. Joseph and Benton Harbor, has retired from the firm. Mr. Morton has been with the company over twenty years and has seen the business grow from a small venture to a fine line of steamers,carrying immense quantities of freight each year and a large number of passengers. Mr. Morton has made many friends among marine men here, who wish him all success in his new business. It is not likely that the name of the company will be changed.

Now comes out a novel plan for disposing of Hyde Park reef. The Chicago Yacht Club, which wants to build a club house on the lake front, now proposes to drive piles all around the reef, fill in with the city refuse and make an island whereon to build a fort and park, pavilions and cafes, run ferries to this charming spot and create a small Garden of Eden for the people of Chicago, when hot days come again. The plan will be passed upon soon, it is said, but it is not known how it will be received.

After a long spell of distant rumblings and other storm signals the wrath of the Society for the Prevention of Smoke has at last visited the penalty on some of the erring tugmen in this city who allowed their boats to make the air musky. One tug line is said to have paid $650 in fines.

Commander John J. Brice has succeeded Commander Nicol Ludlow, in charge of the Ninth lighthouse district.

Buffalo Harbor Improvements.

Special Correspondence to the MARINE REVIEW.

BUFFALO, N. Y., Dec. 22.—Every week makes it plainer that the cry of full elevators did this port much harm. It probably cost us 20,000,000 bushels of grain and did nobody else any good for Chicago and Duluth are both uncomfortable with their holdings. Already the hard wheat has run down below the amount at this time last year. There is a project for a million-bushel elevator to be built across from the foot of Washington street, which will be announced very soon. There seems to be need of it.

There are whispers of a vast scheme for developing the water front in a new direction to make ready for the 20-foot channel, but it is not yet far enough advanced for names and dates. The new Philadelphia & Reading trestle scheme is out and comes by authority. It is to be a practical doubling of that company's facilities here, for the new canal to be dug at the Tifft Farm with dock and trestle to be built on it will bridge over many days when coal would otherwise be short. This dock alone will ship 10,000 tons a day and it is only one of three. Strange to say it is to be built under the supervision of the men who are to handle it. The Reading trestle at Georgia street was built by expert engineers and when it was done the coal wouldn't flow in the pockets, and so many defects were discovered that it had to be overhauled at once.

What lake navigation means the week before Christmas can be understood only by the masters of such boats as the Aurora, Wallalula and Missoula, that came in Sunday and Monday with corn from Chicago. All the consolation they got on their stories of blizzards and snow squalls was a side remark that all the other captains had got their boats laid up and they were at work for nothing. The late fleet will all winter here. The Wallula will unload at once, but the others will hold their grain. This makes fourteen floating cargoes here with considerably over a million bushels on board.

The prospect of immense iron works to be built by the Gattling gun company at Idlewood, a short distance up the lake shore, is ample proof of the need of an outer harbor much larger than the government is willing to give this port. After it has wasted a mint of money building a pocket harbor it will probably grant us one to correspond with our needs.

There is talk of building elevators at Tonawanda, and a citizen of that town calls on certain capitalists to erect one on their property. The uncertain condition of the river channel prevents any such route being taken at present, but it is probable that the government engineer will sometime solve the intricacies of the river. He is now engaged in declaring that the channel is defined by the range lights, but every tugman says he is wrong.

The Apostle Islands.

Special Correspondence to the MARINE REVIEW.

BAYFIELD, Wis., Dec. 22.—The harbor between here and the nearest of the Apostle islands was coated with a thin sheet of ice yesterday, the first of the season. This harbor is usually open until after New Years day and the business that can be carried on between Bayfield and the islands is not interrupted. Were other ports equally fortunate the entire marine business of Lake Superior could be continued a month longer than it now is.

With the close of navigation the business of the Apostle islands takes on a different phase. These islands are twenty-two in number and stretch irregularly northward along the Wisconsin shore. They rise abruptly from the shore and are composed entirely of the red sandstone which of late years has become an article of commerce for building purposes. For many years it has been a problem to their owners to what use they could be put. Their isolation from railroad communication has been their drawback. Since the establishment of so many stone quarries, however, they have come into greater prominence. With the growth of the northwest it is predicted that they will be used as transfer yards for cattle in transit from west to east by rail and water. Should this plan ever be realized it is likely that communication with the mainland will be afforded by means of railroad ferries.

These islands are very fertile, being especially productive of vegetables, and many regard it as certain that they will supply the tables of the northwest twenty years from now. This season they will be scenes of much greater activity than usual. The new process adopted by the Prentice quarries of thawing the stone by steam will be introduced and the quarry owners expect to have a large amount of stone ready for shipment in the spring. Considerable pine will also be cut this winter.

Very Low Figures on the Big Dredging Project.

Special Correspondence to the MARINE REVIEW.

DETROIT, Mich., Dec. 22.—It is probable that everybody interested in the bids for dredging the 20-foot channel throughout the lakes was surprised by the very low aggregate cost of the work. Congress has provided, through the continuous contract system an appropriation of $3,400,000 for this work. Of this amount about 10 per cent. will be reserved for engineering expenses, which would leave a little more than $3,000,000 to be expended for the removal of 5,819,366 cubic yards of material, the amount estimated by Gen. Poe for the entire project. According to the bids received, the contractors agree, however, to do the work for $1,304,434. This total, which is less than half the estimate, will certainly leave a large margin for all contingencies. The low bids brought out by competition prove that the lakes have the greatest dredging plants in this country. The following table shows the lowest bids on the different sections, and the amounts to be paid contractors according to the estimates of material to be removed :

Sections.	Estimates of material to be removed, cubic yards.	Lowest price bid per cubic yard.	Amount to be paid lowest bidders on present estimates.	Lowest Bidders.
Sec. 1.....	90,000	$0.44	$ 39,600	R. J. Cram, Detroit.
Sec. 2.....	380,000	.25 9-10	98,420	C. E. Mitchell & Co., Ludington, Mich.
Sec. 3.....	90,366	2.43	219,589	John Hickler, Buffalo.
Sec. 4.....	67,000	.22	14,740	John Hickler, Buffalo.
Sec. 5.....	256,000	.58	148,480	R. J. Cr m, Detroit. / McCollum & Lee, Essexville, Mich.
Sec. 6.....	950,000	.16½	156,750	James Rooney, Toledo.
Sec. 7.....	2,900,000	.14⅞	431,375	Breyman Bros., Toledo.
Sec. 8.....	1,086,000	.18	195,480	L. P. & J. A. Smith, Cleveland.
Total	5,819,266		$1,304,434	

In last week's issue of the REVIEW a table was printed showing all bids on five sections of the work. Bids on the other three sections were as follows:

BIDDERS.	Section 1—Round Island Shoals, 90,000 yards clay, sand, gravel and hard pan.	Section 4—Mud Lake Shoal, Sailors' Encampment, 67,000 yards sand, gravel and clay.	Section 5—Foot of Lake Huron, 256,000 yards sand, gravel and clay.
	Cents.	Cents.	
R. J. Cram, Detroit.....	*44	29 9-10	*$ 58
Dunbar & Sullivan.....	47	27	.....
L. P. & J. A. Smith, Cleveland.....	47	32	59
McCollum & Lee, Essexville, Mich.....	59	.....	* 58
John Hickler, Buffalo.....	80	*22	.....
Carkin, Stickney & Cram,E.Saginaw,Mich.	87	43	1 30
C. E. Mitchell & Co., Ludington, Mich.....	.....	37	.....
Christopher H. Starke, Milwaukee, Wis.....	.....	42	1 20
Luther E. Allen, Detroit.....	.....	49½	.....
Sadler & Allen, Detroit.....	.....	.....	59 9-10
W. E. Hingston, Buffalo.....	.....	.....	1 29

* Lowest bidder.

Wheat and Corn in Store at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principle points of accumulation on the lakes on Dec. 17, 1892:

	Wheat, bu.	Corn, bu.
Chicago.....	11,111,000	4,568,000
Duluth.....	12,184,000	.....
Milwaukee	2,208,000	20,000
Detroit	1,482,000	49,000
Toledo.....	3,579,000	275,000
Buffalo.....	4,844,000	271,000
Total.....	35,408,000	5,183,000

Iron Mining.

VALUE OF LEADING STOCKS.

Quoted by Chas. H. Potter & Co., No. 104 Superior St. Cleveland, O.

Stocks.	Par Value.	Bid.	Asked.
Cleveland-Cliffs Iron Company	$100 00	$.....	$ 55 00
Champion Iron Company	25 00	.....	42 50
Chandler Iron Company	25 00	.....	42 00
Jackson Iron Company	25 00	.....	.....
Lake Superior Iron Company	25 00	.....	37 00
Minnesota Iron Company	100 00	63 00	65 00
Pittsburgh & Lake Angeline Iron Co.	25 00	.....	135 00
Republic Iron Company	25 00	9 25	.....
Ashland	25 00	.....	.....
Section Thirty-three	25 00	.....	4 00
Brotherton	25 00	2 00	2 50
Iron Belt	25 00	.....	2 00
Aurora	25 00	.....	9 00

In a communication to one of the mining papers relative to the Mesaba range, T. L. Lammers of Duluth says: "The most remarkable mine on the range is probably the Mountain Iron. Test pits had been sunk over an area of about 2,000 feet by 700 to 800 feet, all in good ore, when a place was discovered where the soft ore crops up through the overlying drift. A shaft has been sunk on this place to a depth from surface of forty feet and considerable cross-cuts and drifts made. I went through all the drifts, and there is nothing to be seen but clean rich ore. I have not seen any calculation of the quantity of their ore, nor made one myself, but, judging from the test pits, they have an enormous quantity of good ore. I visited some other properties in the same township where the test pits show up excellent deposits of ore. Following are some of my own determinations from samples taken on different days this fall: Iron 64.35, phosphorus .028, 63.88-.027, 63.63-.040, 64.12-.039, 63.53-.032, etc. Samples from the Biwabik in the same township: Iron 68.21, phosphorus .0299, 65.64-.012. From other properties: Iron 63.20, phosphorus .034, 62.59-.043, 67.22-.007, 62.44-.055, 65.66-.032, 62.76.028, 62.87-.029, etc. There is, of course, some poorer non-Bessemer ore, but almost entirely in the upper parts of the deposits. As a rule the ore becomes richer in iron and poorer in phosphorus as depth is attained.

Lake shipments from the big Norrie mine foot up for the past season 944,667 gross tons, or 37,939 tons in excess of the total shipments of the mine, lake and rail, in 1890, when the output was the greatest ever recorded for any one iron mine in the world. Rail shipments to be added to the lake movement of the past season will bring the total product close to the million-ton mark. Of the lake shipments 598,829 tons went out from Ashland and 345,775 tons from Escanaba.

Following are some prices asked for Mesaba range stocks: Cincinnati $2.25, Great Northern $9.75, Mesaba Mountain $22, Biwabik $34.50, Kanawha $1.90, Lake Superior $2.75, Mountain Iron $85, Minneapolis $2, Shaw $3.50, Security Land and Exchange Company $20, Washington $4.

Capt. John Pingilly succeeds Joseph Selwood as manager of the Chandler, Vermillion range.

The Brotherton has declared a dividend of 50 cents a share, payable Jan. 3.

Following are the total lake shipments of the past season from iron mines located in the vicinity of Ishpeming and Negaunee:

Name of mine.	Gross tons.	Name of mine.	Gross tons.
Buffalo	380,714	Cleveland	310,907
Cambria	41,549	Iron Cliffs	289,395
Lillie	29,000	Lake Angeline	287,517
Lucy	26,326	East New York	40,000
Grand Rapids	22,826	New York	11,220
Jackson	92,464	Lake Superior	371,530
Negaunee	85,846	Winthrop	191,576
Volunteer	127,130	Marquette	9,555
Platt	2,676		

ANY ONE SENDING TWO ADDRESSES AND $4 TO THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND, WILL, IN ADDITION TO HAVING THE BEST MARINE PAPER SENT TO THEM FOR A YEAR, RECEIVE A COPY OF WASHINGTON IRVING'S LIFE AND VOYAGES OF CHRISTOPHER COLUMBUS.

Lake Carriers' Association.

M. A. BRADLEY, President.

VICE-PRESIDENTS: James W. Millen, Detroit, Mich. — John G. Keith, Chicago, Ill. — Frank J. Firth, Erie, Pa. — W. S. Brainard, Toledo, O. — Thomas Wilson, Cleveland, O. — R. P. Fitzgerald, Milwaukee, Wis. — Peter F. Miller, Buffalo, N.Y. — Alex. McDougall, Duluth, Minn.

Charles H. Keep, Secretary, Buffalo, N.Y. Geo. P. McKay, Treasurer, Cleveland, O.
Harvey D. Goulder, Counsel, Cleveland, O.

At the last meeting of the association Secretary Keep called attention to a communication from Commander Woodruff, inspector of the ninth light-house district, asking if there would be any objection to the removal of certain buoys in lake channels which have not been used of late. Among the buoys which it is proposed to remove are the following:

Maumee Bay—Buoys Nos. 1, 3, 5, 7, 2, 9, 11, 4, 13, 6, 15, 8, 10, 22, 24, 23, 25, 26, 27, 29, 31, 28, 33, 35, 37 and 39 on pages 33, 34 and 35 of buoy list. Twelve of these are to be used in marking the new straight channel.

Lake Erie—Raisin point buoy No. 7, and Point Monille buoy No. 9, on page 37 of the buoy list. These are to be used in marking the entrance to the straight channel in Maumee bay.

Detroit river, west channel—Buoys Nos. 2, 4, 6, 8, 10 and 12 and Gibraltar middle ground (upper and lower) buoys on page 39 of the buoy list. These buoys were placed to mark a twelve-foot channel which was used before the new channel through the Lime Kiln crossing was cut. The channel is not used at present and will not permit of a draft of even twelve feet with safety.

New Steamers for Atlantic Lines.

Plans for the six new steamers to be built for the Inman line have progressed far enough so that keel blocks have been placed and material is being prepared. Four are to be smaller than the City of Paris and are to run between New York and Antwerp. Two are to be larger, and with the City of Paris and City of New York will make up the Southampton line. The smaller ships will have 17,000 horse power and the larger ones will have 25,000 horse power, all having twin screws. The engines will be vertical, inverted, quadruple expansion, requiring a working pressure of 210 pounds. The use of quadruple engines of this power and also the use of quadruple engines in the two Great Northern steamers of 7,000 horse power, building by the Globe Iron Works Company, Cleveland, will be the first instances of their use where more than 4,000 horse power is required. The weight and size of boilers capable of furnishing steam at 210 pounds has in the past been too great for their use where such high power has been demanded. This difficulty is being overcome in the Northern boats by the use of water tube boilers, but the Cramps will still hold to Scotch boilers, constructing them smaller and much heavier than those in use at present. A saving of 10 per cent. of fuel is claimed for the extra cylinder, and this saving in the large Cramp steamers will amount to 50 tons per day.

Dispatches sent out by the newspaper associations report that contracts have been awarded to Clyde builders for six steamers, three of which are about 430 feet long, 45 feet beam and 33 feet deep and about 3,000 tons, and three about 350 feet long, to be run in connection with the Chesapeake & Ohio Railroad. A steamship company has been formed in London to build and manage the steamers. Additional steamers will probably be built in this country. Last year the railroad company loaded 120 steamers at Newport News, its terminal.

Total Documented Tonnage of the United States.

The bureau of navigation, treasury department, reports that the entire documented tonnage of the United States is as follows:

DOCUMENTED VESSELS.

	1892.	
	No.	Tons.
Registered	1,532	994,675.47
Enrolled and licensed	22,851	3,770,245.73
Total	24,383	4,764,921.20

Last year the total documented tonnage was 4,684,758 tons.

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

JOHN M. MULROONEY, ... } PROPRIETORS.
F. M. BARTON, ... }
HOMER J. CARR, . . . Associate Editor and Manager Chicago Office, Western Union Building, 110 LaSalle Street.

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SUBSCRIPTION—$2.00 per year in advance. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,600 vessels, measuring 1,154,870.38 tons in the lake trade. In classification of this fleet the lakes have more steamboats of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The number of vessels of 1,000 to 2,500 tons on the lakes on June 30, 1891, was 310 and their aggregate gross tonnage 512,787.58; in all other parts of the country the number of this class of vessels was, on the same date, 213 and their gross tonnage 319,750.84. The classification of the entire lake fleet is as follows:

Class.	Number.	Tonnage.
Steam vessels	1,592	756,751.53
Sailing vessels	1,243	325,131.06
Canal boats	703	72,515.42
Barges	62	20,472.37
Total	3,600	1,154,870.38

Tonnage built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	No. of boats.	Net Tonnage.
1887	152	56,488.32
1888	222	101,102.87
1889	225	107,080.30
1890	218	108,515.00
1891	204	111,856.45
Total	1,021	485,042.94

St. Mary's Falls and Suez canal traffic: Number of boats through St. Mary's Falls canal in 1890, 228 days of navigation, 10,557; tonnage, net registered, 8,454,435. Number of boats through Suez canal during 1890, full year, 3,389; tonnage, net registered, 6,890,014. Number of boats through St. Mary's Falls canal in 1891, 225 days of navigation, 10,191; tonnage, net registered, 8,400,685. Number of boats through Suez canal during 1891, full year, 4,207; tonnage, net registered, 8,698,777.

Entered at Cleveland Post Office as Second-class Mail Matter.

OFFICERS of the revenue cutter service want appropriations from the present congress for two new vessels for the lakes, and this explains the present agitation regarding the Canadian revenue cutters constructed at Owen Sound. Only one of these Canadian vessels remains on the lakes. The treasury department is fully justified in asking that the old revenue cutter Andy Johnson on Lake Michigan be replaced by a new boat, and that a new vessel be built also to take the place of the Bibb, recently condemned on Lake Ontario, but no good can come from the effort to create a scare about Great Britain ruling the lakes, which has been attended by a great deal of nonsense. Modify the treaty of 1817, so that lake ship builders can secure some portion of the naval work due them on account of their enterprise, but let it end with that.

IT was expected that the bill providing for a readjustment of salaries in the steamboat inspection service would come up in the house before the holiday adjournment, but the slim attendance of members has caused delay with a large amouut of important legislation. When this bill is taken from the calendar, however, it should be passed without further consideration for the opposition from the inspectors whose salaries will be reduced. The men who do most work in this service, as in any other, should be recognized. This blll has been recommended by the secretary of the treasury and by the supervising inspector general, and it does not speak well for the service that local and supervising officers should appear in open and active opposition to their superiors in a matter of this kind. It is another case in which the bad effects of politics in this service are shown.

IF the Duluth chamber of commerce decides, as a result of its present inquiry, to call a waterways convention in Washington, all commercial bodies on the lakes should immediately join in the movement, in order that the meeting may not be a failure. There has been some question about the advisability of holding a convention at this time, but a full representation should be secured by all means if the call is made. The annual meeting of the Lake Carriers' Association will take place in Detroit, Jan. 12, and the date of the Washington meeting should be fixed so as not to conflict with the Detroit gathering.

REPORT has it that the government contemplates sending the new practice cruiser Bancroft to the world's fair in Chicago in the spring. The Bancroft is only 187 feet long and 32 feet wide, drawing about 11½ feet of water, and could be taken through the Welland canal. It would certainly be a good move to replace the old battleship Michigan by the Bancroft on the lakes.

Congressional Matters.

Notwithstanding objections from Congressman Holman and a few other members of the lower house who know little of the importance of lake commerce, the omnibus bill authorizing the establishment of light-houses, fog signals, etc. is in a fair way to be passed. Passage of the bill was recommended to the house by the committee of the whole on Wednesday, but action was delayed, on account of a quorum not being present. The bill as recommended to the house carries all of the important aids to navigation sought in the last session by lake vessel owners. The items removed from the old biil were mainly lights and light ships for the Detroit river and for the shoals at the entrance to Green Bay, which were provided for in the closing days of the last session, and which will be in operation next season.

It is more than probable that the present congress will instruct the secretary of war to investigate the raft towing question on the lakes. In accordance with a request from the vessel owners, Senator McMillan introduced in the senate on Tuesday a resolution authorizing the secretary of war to appoint a board of three officers of the engineer corps of the army to look into this subject, and report to congress what restrictions, if any, should be placed upon the size and manner of constructing and towing rafts upon the waters mentioned. The plan of the vessel owners is to go before congress fortified with a report from the war department when the time comes for the passage of a law governing the movements of rafts.

Secretary Keep, Capt. Geo. P. McKay and others, who have followed up, with letters to several members of congress, the recommendation that $50,000 be appropriated for survey work and for the correction of lake charts, seems to have good reason for expecting success in their efforts. Gen. Casey, chief of engineers, Gen. Poe, who made the recommendation, are heartily in favor of this measure, and at a meeting, a few days ago, of a sub-committee of the committee on commerce, Representative Chipman was assisted in explaining the urgent need of this appropriation by Capt. Turtle of the engineer corps. The commerce committee will very probably cause this item to be inserted in the sundry civil appropriation bill.

At the last meeting of the finance committee, Lake Carriers', it was proposed to have a banquet in connection with the annual meeting in Detroit on Jan. 12. The matter was not given serious consideration, although it has since developed that a great many members of the association are of the opinion that a social affair of this kind in connection with the annual gatherings would increase the attendance and would tend to promote good feeling.

Congressman Curtis seems to be a very energetic worker in behalf of his constituency. In the house, a few days ago, he succeeded in bringing about the passage of a separate bill for the establishment of a fog signal at Tibbett's point, foot of Lake Ontario, New York, at a cost not to exceed $4,300.

Georgia pine does not seem to answer well for use as decking on fresh water. The deck of the steamer W. H. Wolf, which came out in 1887, is already used up through decay and it is said that some of her Georgia pine deck beams are also badly decayed. The Wolf is now at the Milwaukee Dry Dock Company's south yard for a new deck and deck beams where needed. Northern pine deck plank will be utilized.—Milwaukee Wisconsin.

Method of End-on Launches.

As nearly all vessels built in lake ship yards are launched beam-on, there is not so much computation necessary, but the incline of ways, thickness of grease, etc., are figured to a nicety when large steel merchant or naval vessels are launched on tide-water. Experience and guess work are not sufficiently reliable where the safe delivery of a $100,000 or $2,000,000 hull is concerned. With mathematics and applied science the time required for a hull to travel from the blocks to the water can be figured to a second. On tidal waters the launch must take place exactly on time Preparations are made for it, says the New York Sun, before the keel is laid. The incline of ways has to be figured, and it usually is from ½ to 1 inch to the foot, the heavier the vessel the less incline, of course. The City of Paris had ½-inch and the Columbia 13-16 of an inch. It was thought the latter would launch in 30 seconds, but it only required 29. Over five tons of tallow was used, and as it was very warm about 15 per cent. stearine was mixed with the tallow to keep it from running. The weight of the vessel and buoyancy of the water are important factors to be determined. When the vessel is half off the ways, their height from the water and their incline must be sufficient to continue the vessel on the same line of projection. If the vessel is so heavy that her forward part sinks into the water so that the stern is lifted from the ways, a strain is put on the decks amidships, and if, on the other hand, the buoyancy is greater than the displacement, the bottom of the hull is strained amidships.

Mr. Sheldon, now with the Globe Iron Works Company, Cleveland, has had a wide experience in launching vessels from European yards. He says that a simple method to determine if the hull has been strained in launching is to stretch a fine wire from stem to stern, having it fastened at intermediate points. If the hull is strained the wire will part. This is also done sometimes before machinery is placed in the hull.

When the hour for an end-on launch approaches, most of the props are taken down and the vessel rests on the keel blocks and one or two sets of stocks at the sides. The ways and cradle have been fixed in place and wedges have been adjusted above the cradle and under the poppet blocks on which she rests. Four men take care of four wedges. The signal is given and the men drive home the wedges. The vessel is lifted just clear of the keel blocks and rests on the ways. Alternate keel blocks are knocked away, beginning at the stern. Another "wedging up" follows, and then all the props at the sides are removed. After a rest the third wedging comes, and then all the keel blocks are knocked down, the word is given, and the planks that hold the cradle to the ways proper at the bow are sawed off, and the vessel starts down to the water. It requires about 600 men and it costs $5,000 to launch vessels like the New York and Columbia.

Success of Electric Launches.

The success of electric launches was demonstrated by the competitive trial at the world's fair grounds, which resulted in the lagoon transportation contract being given to the Electric Launch and Navigation Company. This company has contracts with the Detroit Boat Works for 25 launches and with the Racine Boat Works for a like number. These launches will be 34 feet long and 6 feet beam, and will carry 78 storage cells, each of 125 ampere hours capacity, developing a total energy of 2,250 watt hours. At the trial the Electra ran 10 hours with 25 people aboard, and made a speed of from 9 to 11 miles per hour. The electric launch Corcyra, recently built for John J. Astor, is about the same dimensions of the Electra, and is the first craft of her kind in the country owned by private parties. The Corcyra can run 60 or 70 miles, and is used as a launch for the steam yacht Nourmahal, which has an electric plant, and can charge the launch batteries as she hangs in the davits. The starting and stopping is done with a switch, which can be turned to regulate the speed from 3 to 10 miles per hour. The success of this type of launch is assured, but the first cost and expense of storage batteries will confine its use to millionaires for several years at least.

Trade Notes.

The Bucyrus Steam Shovel and Dredge Company will soon move to South Milwaukee, Wis., where a new plant, to be fitted with entirely new machinery, has been erected. No delay to their work will be caused by the removal. Electricity will be generally used as motive power in the new plant.

The Detroit Dry Dock Company presents a handsome glass paper weight, showing the City of Detroit steaming out in the lake in the glass, as compliments of the season to their patrons and friends. There is probably no shipbuilding company on the lakes that puts out advertising in as attractive form as this company.

R. B. Dear and Winstoe Bros. of Minneapolis will build the new ore dock to be constructed at Two Harbors by the Duluth & Iron Range Railway Company. The lumber required in the construction of the dock will amount to 6,500,000 feet. The structure will be 2,000 feet long and will contain 288 pockets with a capacity of 35,000 tons. The work will begin Jan. 2 and will be finished by the opening of navigation.

We are pleased to learn that the Penberthy Injector Company of Detroit, Mich., has been compelled by the rapid increase in their business during the past twelve months to enlarge their factory. They are now erecting a new building and also making some changes and improvements in their present factory, which will give them nearly double their present capacity. During the past year, they report that sales on their old reliable Penberthy injector have been exceedingly large, and also that their new specialty, the safety crank pin oiler,which was only recently placed on the market, has met with a most unprecedented sale.

It will be some time before the bids opened at the navy department last week for the construction of the battleship Iowa and armored cruiser Brooklyn will be passed upon, but it is almost certain that the vessels will be built by William Cramp & Sons. Bids submitted by Cramp & Sons, the Union Iron works, and the Newport News company for the Brooklyn were $2,986,000, $3,050,000, $3,147,000, and for the Iowa $3,010,000, $3,150,000, $3,233,000. The Bath Iron Works submitted their own designs for the Brooklyn at a cost of $3,165,000 and for the Iowa at $3,185,000. The Cramps made several bids on their own designs, one of which contemplates the use of quadruple engines.

Do You Want a Photograph of Your Steamer?

To accommodate subscribers who are anxious to secure photographs of lake steamers in which they are in any way interested the MARINE REVIEW has made a collection and is able to furnish 7x9 photographs, well mounted, of the following steamers at $1 each. Write to the MARINE REVIEW, 516 Perry-Payne building, Cleveland, O.:

Arabia,
America,
Averell, W. J.,
Avery, Waldo A.,
Alaska,
Albany,
Atlanta,
Argonaut,
Boyce. Mary H.,
Boscobel,
Baldwin, S. C.,
Buffalo,
Boston,
Bieleman, C. F.,
City of Duluth,
City of Rome,
Caledonia,
City of Ludington,
City of Racine,
Cayuga,
City of Fremont,
City of Naples,
Chemung,
Clarion,
Conemaugh,
Conestoga,
Chicago (Goodrich Line),
Chicago (West'n Tr. Co.),
City of Traverse,
City of Paris,
Codorus,
Donaldson, Jas. P.,
Eddy, John F.,
Egan, W. M.,
Eddy, C. A.,
Fayette,
Foster, Parks,
Florida,
Flower, R. P.,
Gilcher, W. H.,
Gogebic,
Grecian,
Gladstone,
Grover, M. B.,
Gilchrist, J. C.,
Harlem,
Helena,
Haskell, W. J.,
Hall, John E.,
Hudson,
Hurd, Jos. L.,
Italia,
Indiana,
Ionia,
Juniata,
James, H. R.,
Jewett, H. J.,
Langdon, Jas. R..
Lackawanna,
Louisianna,
Lehigh,
Lycoming,
Lawrence,
Manola,
Maruba,
McVittie, A.,
Masaba,
Maryland,
Marina,
Mather, Sam'l (whaleb'k)
Maytham, Thos.,
Manchester,
Merrimac,
Minnesota,
Manhattan,
Massachusetts,
Marshall, Sam'l,
Mills, Rob't,
Milwaukee,
Mahoning,
Neosho,
New York,
Northern King,
North Wind,
Owen, J. Emory,
Owego,
Owen, Ira H.,
Onoko,
Portage.
Palmer, Thos. W.,
Packer, R. A.,
Petoskey,
Peerless,
Parnell, C. S.,
Philadelphia,
Prince, F. H.,
Perrett, J. C.,
Pathfinder (whaleback),
Panther,
Pillsbury (engines),
Pontiac,
Rochester,
Rosedale,
Rugee, John,
Russia,
Smith, Gov.,
Saranac,
Syracuse,
Susquehanna,
Seneca,
Sachem,
Smith, Ed.,
Schuyikill,
St.Lawrence, (do engines)
Scranton,
Sheboygan,
Shaw, John (schooner),
Tilley, Sir S. L.,
Tacoma,
Tuscarora,
Thomson,A.D.,(whaleb'k)
Tioga,
Uganda (engines),
Viking,
Virginia,
Vance, F. L.,
Wheeler, F. W.,
Wyoming,
Williams, George F.,
Wisconsin,
Wissahickon,
Wilbur, E. P.,
Westcott, J. W.,
Washburn,

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Work of the Ship Yards.

James Davidson, West Bay City, Mich., will soon lay a keel for a 220-foot lumber steamer.

Leatham & Smith's schooner I. N. Foster is having machinery put in at Manitowoc at an expense of $8,000, and will come out a steambarge in the spring.

H. N. Botsford of the Wolverine Dry Dock Company, Port Huron, Mich., will build a cutter yacht after the model of the Detroit Gloriana. Her dimensions will be 68 feet over all, 45 feet on water line, 13 feet beam and 10 feet deep. She will be sloop rigged.

It is reported that the Cowles Engineering Company, foot of Forty-third street, South Brooklyn, N. Y., is establishing a steel ship building plant that will be large enough for the construction of a full-sized steamer. The company expects to spend $500,000 for machinery and buildings.

The steamer Chicago of the Western line will be rebuilt at Buffalo this winter. The old arches will be replaced with steel. The Montana of the same line will get new boilers. The Robert Mills and Saginaw Valley will also get new boilers. Solid bulwarks will be included in the Saginaw Valley's repairs.

The White Line Excursion Company, William J. Zeigel and others of Buffalo is having an excursion steamer built at Mason's ship yard, Black Rock, N. Y. Her dimensions are 145 feet over all, 32 feet beam and 10 feet deep. She will cost about $35,000, have double engines, 18 by 20, and twin screws. The machinery will be built by David Bell, Buffalo.

Two steam yachts over 100 feet long are building at the works of the Davis Boat and Oar Company, Detroit, Mich. One of the boats, 118 feet long and 17 feet beam,is for Michael Cudahy, millionaire pork packer of Chicago. The triple engine will have cylinders 10, 16 and 25 inches by 15 inches stroke, and she will have a water tube boiler. The cabins will be finished in mahogany and she will have a 50-light electric plant and search light. She will cost $40,000 and is expected to make 19 miles an hour. The other yacht is 108 feet long, 90 feet water line and 17 feet beam. She will have 10 and 20 inch compound engines, water tube boiler and will cost $21,000. She is for George S. Davis of Detroit.

Around the Lakes.

Truman & Cooper of Manitowoc have the contract for extending Grand Haven piers. The north pier will be extended 250 feet and the south pier 200 feet.

The desk calendar issued by the Pope Manufacturing Company, Boston, contains a leaf for each day in the year, and on each one is given the day of the week, month and year, and hints on road making and bicycling.

Captains Frank B. Hackett and John McCormick of Amherstburg have purchased the steamer Energy of Wallaceburg. She will be fitted up as a wrecker and will have a steam pump and steam hoist aboard. She will be stationed at Pelee island and used as a wrecking tug in connection with the Hackett Wrecking Company, and will also convey freight from the island.

At D elevator of the Lake Superior Elevator Company in Duluth a few days ago, 157 carloads of wheat, containing 95,000 bushels, were unloaded and weighed in four hours and forty minutes. This is the fastest record ever made by any elevator in the world. Elevator D has several times broken the record for loading out wheat, and has shipped over 450,000 bushels in ten hours.

Capt. William Mack and others of Cleveland have purchased the steamer V. H. Ketchum from Col. James Pickands for $55,000 The Ketchum was built at Marine City in 1874, is rated A2 and has an insurance valuation of $65,000. About $7,000 was spent in repairing damages done by the Maruba this fall. The boat has been kept up well and is considered a good purchase. Capt. Mack will sail her.

When the steamer Samuel Mather was laid up the crew presented Capt. J. H. Smith and Chief Engineer Irwin Marshall with gold rings. To Captain Smith a testimonial letter expressing good feeling and thanking him for his kindness was also presented. If this feeling was more general between officers and crews and it was expressed occasionally, the life of lake-faring men would be a great deal happier. The idea that kindness creates insolence was brought to the lakes from salt-water and does not belong here.

Report of Engine Trials of Steamer Cadillac.

This trial was made for the purpose of observing the economical working of the machinery, and the run was from Ashtabula light to the "Dummy" light, a distance of 87 miles. The boat was loaded with coal. Indicator cards were taken every hour. The fuel was lump coal of good quality, weighed on platform scales. The sea was smooth and wind light and the steering engine was used throughout the trial. The record is as follows:

Time.	Revolution Counter.	Steam lbs.	Guages, I.P. lbs.	Guages, L.P. lbs.	Vacuum inches.	Temperature of feed, degrees F.
*5:17	1,103	146	46	1	22	106
3:31	2,365	155	53	7	22.25	132
6:00	5,051	155	54	7	22	130
6:29	7,790	156	54	7.5	22	132
7:30	13,522	155	54	7.5	22	134
8:00	16,361	155	54	7.75	22	134
8:30	19,191	156	54	7.75	22	134
9:00	22,032	156	54	7.75	22	134
9:30	24,855	156	54	7.75	22	134
10:02	27,892	155	54	7.75	22	134
10:30	30,520	154	54	7.75	22	134
11:00	33,365	155	54	7.75	22	134
11:30	36,184	155	54	7.75	22	133
12:00	39,021	156	54	7.75	22	134
†1:25	46,909	153	54	7.5	22	128

* Passed Ashtabula light.
† Abreast of "Dummy."

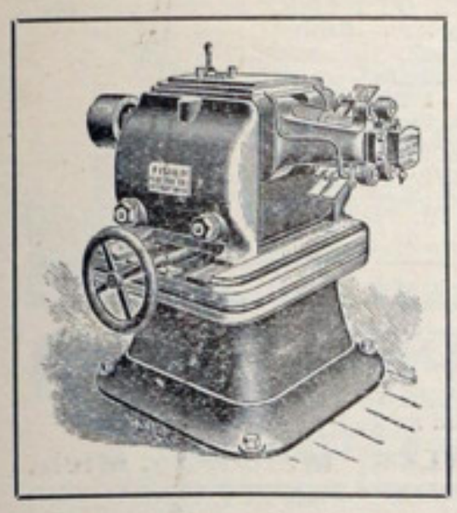
The H. P. valve gear was linked up 1½ inches, the I. P. ⅜ inches and the L. P. 3 inches. Following are the results:

Date of trial	Nov. 16 and 17, 1892.
Draught of steamer at Ashtabula, forward	13 ft.
" " " aft	13 ft. 6 in.
" " " mean	13 ft. 3 in.
" " at "Dummy," mean, estimated	13 ft. 2½ in.
Mean draught during trial	13 ft. 2¾ in.
Duration of trial	7 hours 8 minutes.
Distance run, Ashtabula to "Dummy"	88 miles
Speed, mean	10.82 miles
Diameter of screw	10 feet
Pitch of screw	12 feet
Slip	15.4 per cent.
Type of Engine	Triple
Cylinder, diameter H. P	15 inches
" " I. P	25 "
" " L. P	42 "
Stroke	30 "
Boiler, Scotch, diameter	13 feet
" " length	11 feet 6 inches
Furnaces, number	3
" diameter	40 inches
Heating surface, total	2,007 square feet
Grate surface	60 square feet
Ratio	33.45
Mean boiler pressure	154.5 pounds
Mean vacuum in condenser	22 inches
" I. P. receiver pressure	53.4 pounds
" L. P. " "	7.5 "
" temperature of feed water	131
Revolutions per minute, mean	93.9
Indicated horse power, mean H. P	155.08
" " " " I. P	179.48
" " " " L. P	175.81
Total indicated horse power, mean	510.37
Coal burned, entire run	9,750 pounds
" " per mile	110.8 "
" " per hour	1,198 "
" " per square foot of grate per hour	19.96 "
" " " " of heating surface	0.59 "
" " per indicated horse power per hour	2.34 "
Heating surface of boiler per I. H. P	3.93 square feet
I. H. P. per square foot of grate	8.56

A similar statement of results obtained from a trial of engines of the steamer Pioneer, owned by the same company, the Cleveland-Cliffs Mining Company, will be furnished in the next issue of the REVIEW. The Cadillac was built by the Chicago Ship Building Company and engined by the Cleveland Ship Building Company.

The National Government Can Alone Meet the Cost.

Ship-canal projects are receiving greater support than ever. Whether it is fear or jealousy of the success of the Canadian canal system, it is certain that the scheme to connect the Hudson river with all the great lakes by a system of ship-canals will ultimately be carried out. The proposition presents so many advantages, and the possibilities of success are so many that the ultimate value of such a system to so very large a part of the country warrants the support that is given to the subject by commercial bodies in the interior and on the seaboard. It is not so much a question as to the advisability or practicability of such a system. Those points seem to have been settled favorably. It is now no more a question as to who shall build the new canals and enlarge the old. Whether national government, state, or local money shall pay for it is now to be found out. Over that point will the fighting be done.—Maritime Register.



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OF OUR MANUFACTURE are endorsed by the following Owners and Managers of some of the Finest Steam Vessels on the Lakes:

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W. P. HENRY, Buffalo, N. Y. General Manager Lehigh Transit Co.	Four Steel Freight Steamers
JOHN GORDON, Buffalo, N. Y. General Manager Northern Steamship Co.	Five Steel Freight Steamers
DAVID CARTER, Detroit, Mich. Gen'l Mgr. Detroit & Cleveland Steam Navigation Co.	Three Side-wheel Passenger Steamers
T. F. NEWMAN, Cleveland, O. Gen'l Mgr. Cleveland & Buffalo Transportation Co.	Two Side-wheel Passenger Steamers
J. C. RICKETSON, Milwaukee, Wis. General Manager Inter-Ocean Transportion Co.	One Steel Freight Steamer
A. W. COLTON, Toledo, O., General Manager Lake Erie Transportation Co.	One Side-wheel Passenger Steamer and four Freight Steamers
L. C. HANNA, Cleveland, O. President Mutual and Menominee Transportation Companies.	Nine Steel Freight Steamers
JAMES PICKANDS, Cleveland, O. President Minnesota Steamship Co.	Four Steel Freight Steamers
HARVEY H. BROWN, Cleveland, O. Brown Steamship Co. and Lake Superior Iron Co.	Five Steel Freight Steamers
SAMUEL MATHER, Cleveland, O. President Huron Barge Co.	One Steel Freight Steamer
ASHLEY & DUSTIN, Detroit, Mich.	One Side-wheel Passenger Steamer
U. S. LIGHT-HOUSE BOARD, Washington, D. C.	Two Light-House Tenders

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Which can be handled by an engineer without any previous knowledge of electric plants, and which will operate arc and incandescent lamps from the same dynamo, write the

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Space under this heading may be used gratis by our advertisers or subscribers to call attention to vessels or any craft, machinery, new or second hand, that they may have for sale. Those wanting machinery of any kind or wishing to purchase vessels, are invited to take advantage of the same offer. Employers in need of professional men or men who want positions may avail themselves of the opportunities offered. Each item will be limited to three lines. Letters concerning same must mention number attached to item and be addressed MARINE REVIEW, 516 Perry-Payne Building, Cleveland, O.

159—FOR SALE—Lighter, 72 feet long, 16 feet beam, and 5 feet deep. Will sell for $300.

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These Wheels are noted for their extra speed, towing power and proportionate saving of coal.

PRICES QUOTED ON APPLICATION.

UNITED STATES ENGINEER OFFICE, Detroit, Mich., December 13, 1892. Sealed proposals for furnishing all labor, materials and appliances, and constructing the floors, etc., of the 800-foot lock at St. Mary's Falls Canal, Mich., will be received at this office until 2 p. m., standard time, January 12, 1893, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application to this office. O. M. POE, Col. Corps of Engineers. Bvt. Brig. Gen., U. S. A.

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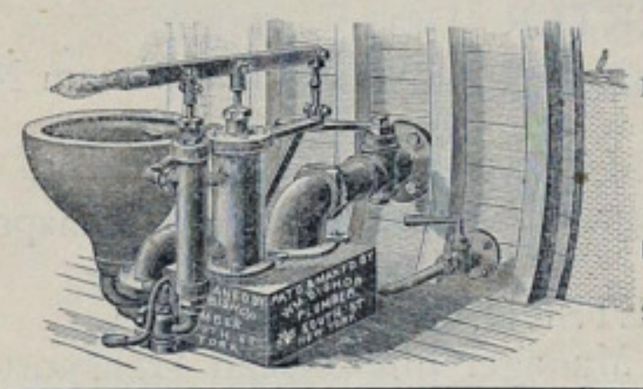

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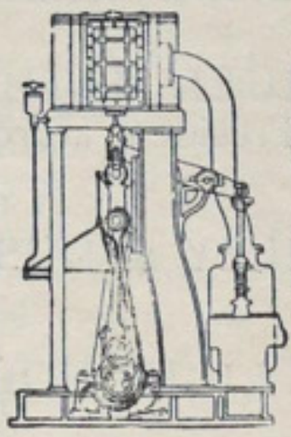

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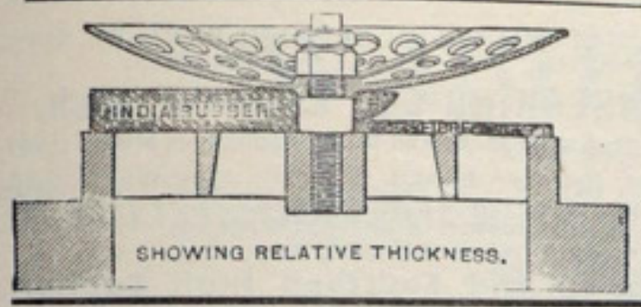

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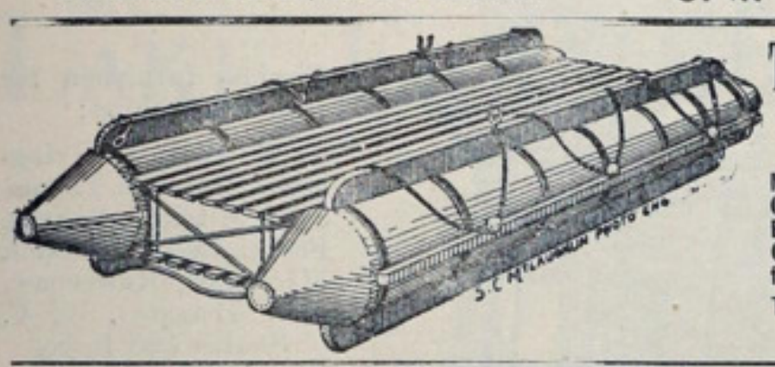

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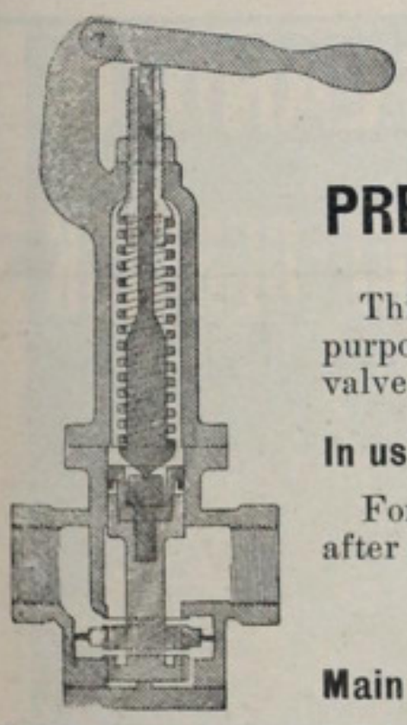

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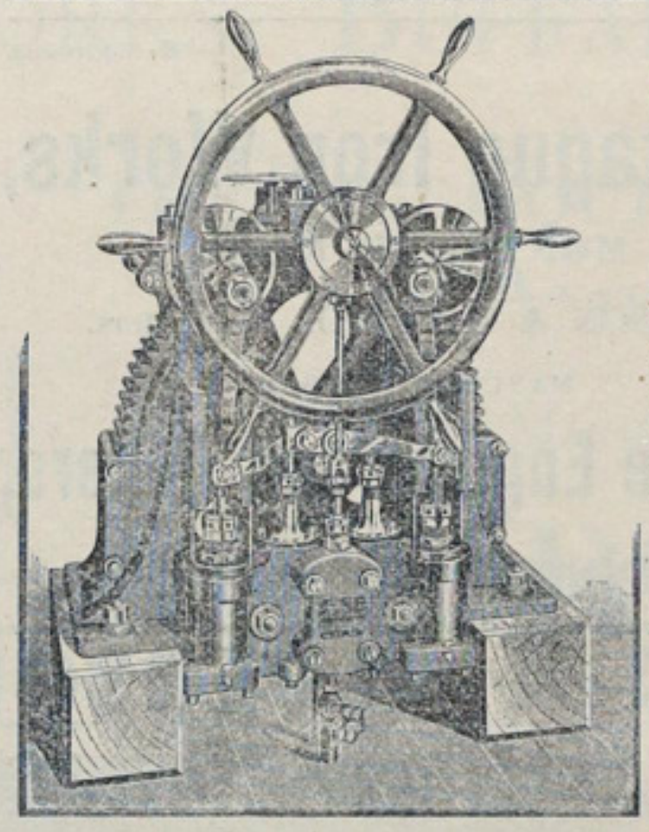

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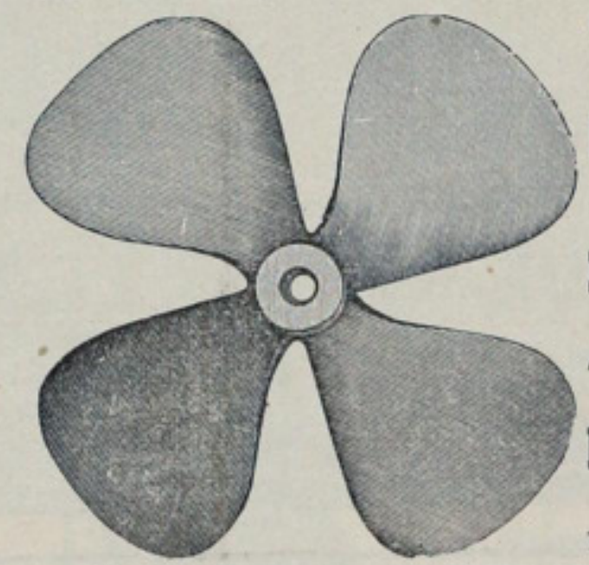

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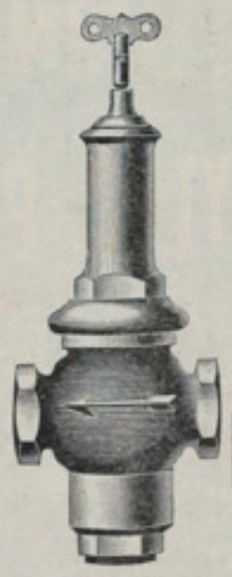

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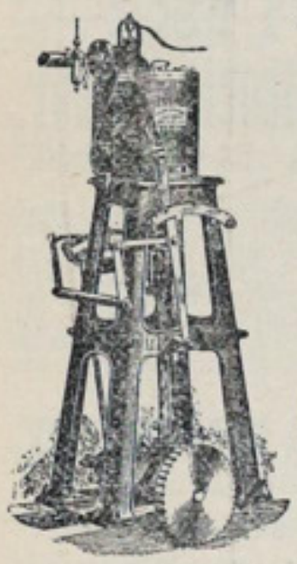

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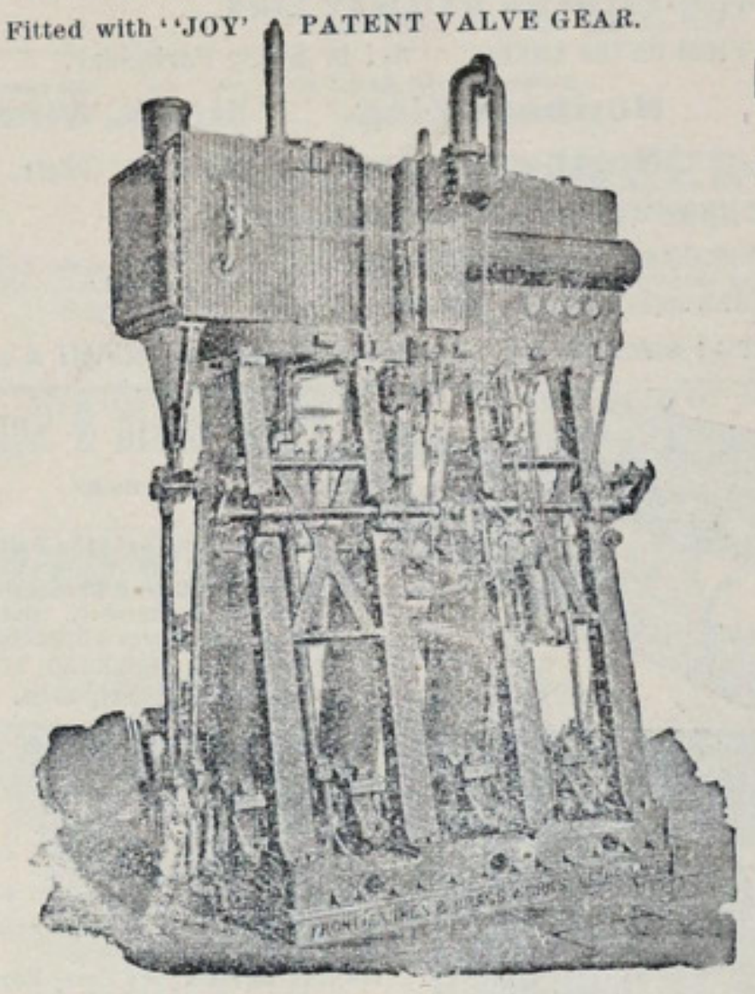

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TRIPLE EXPANSION

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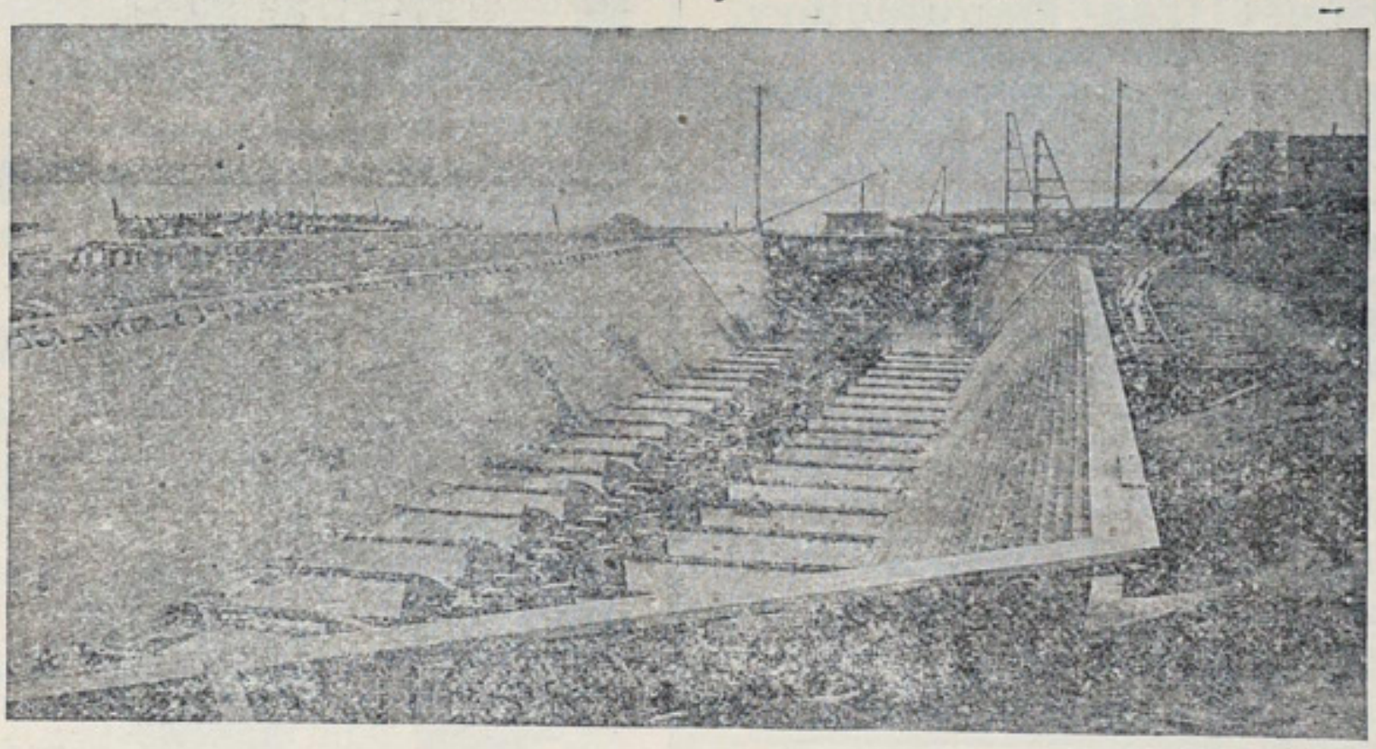
DOCK HAS PIT TO SHIP RUDDERS.



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Depth: to floor 20 feet. to sill 18 " on blocks 16 "

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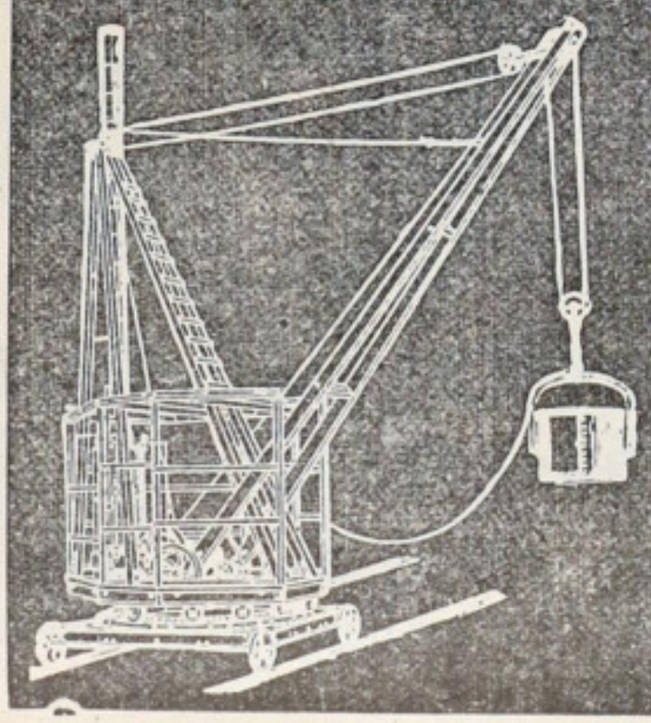

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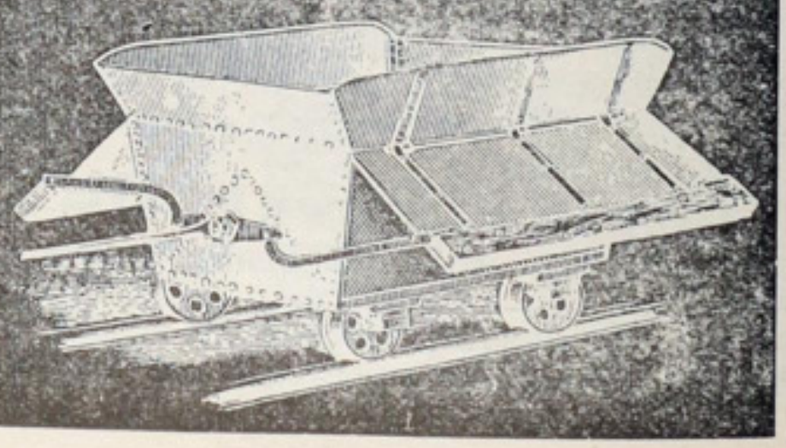

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WIRE ROPE AND CABLE.

Galvanized Iron Wire Rope for Ship's Rigging.
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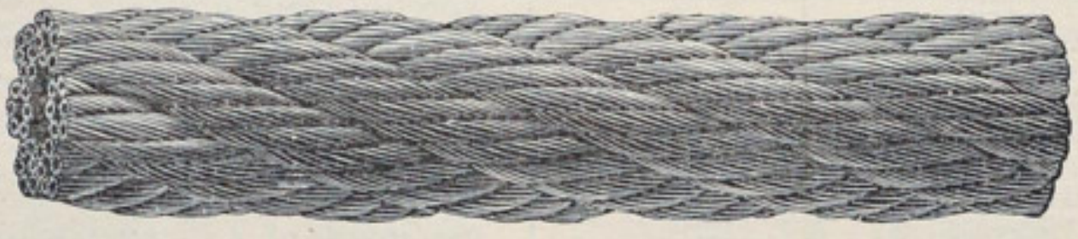

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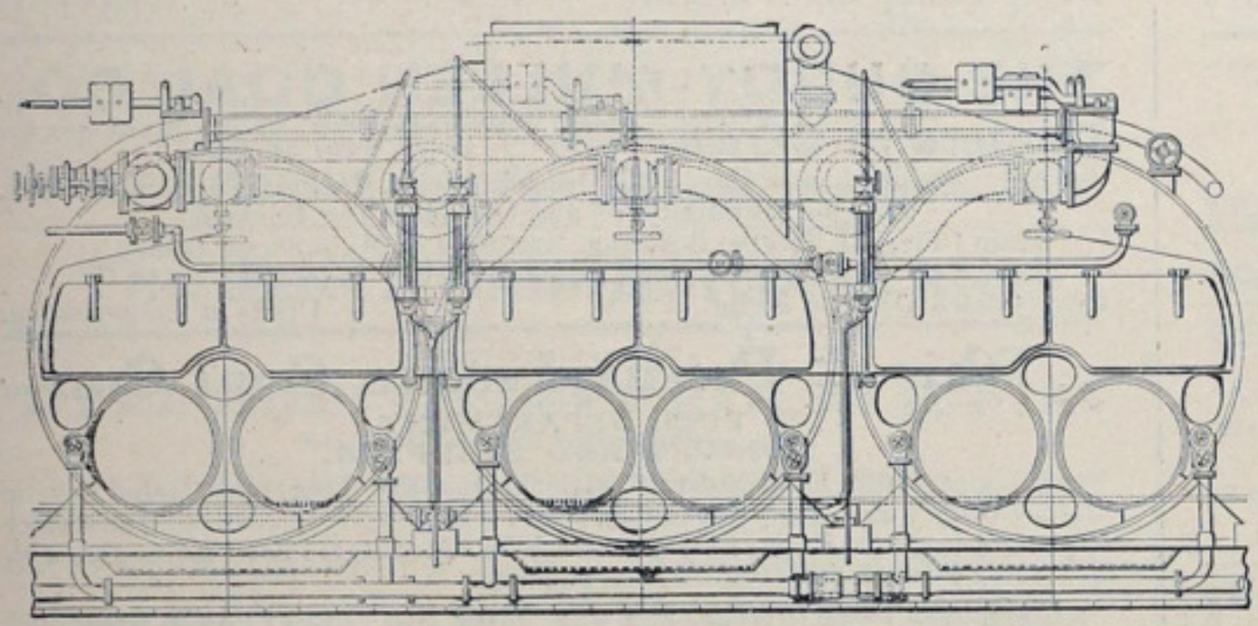

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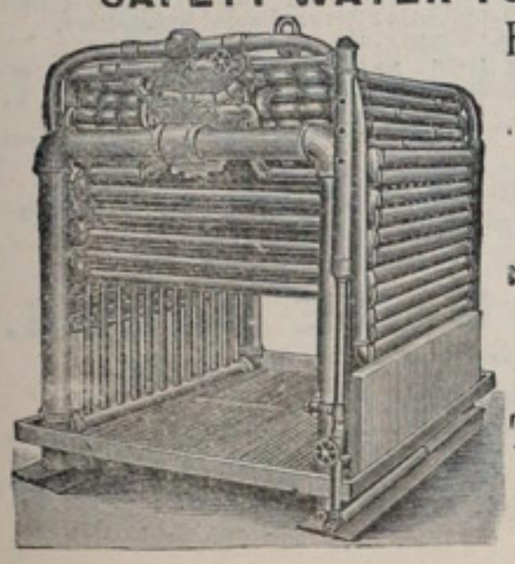

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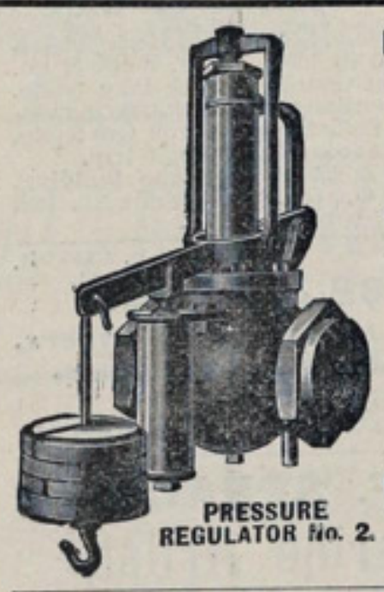

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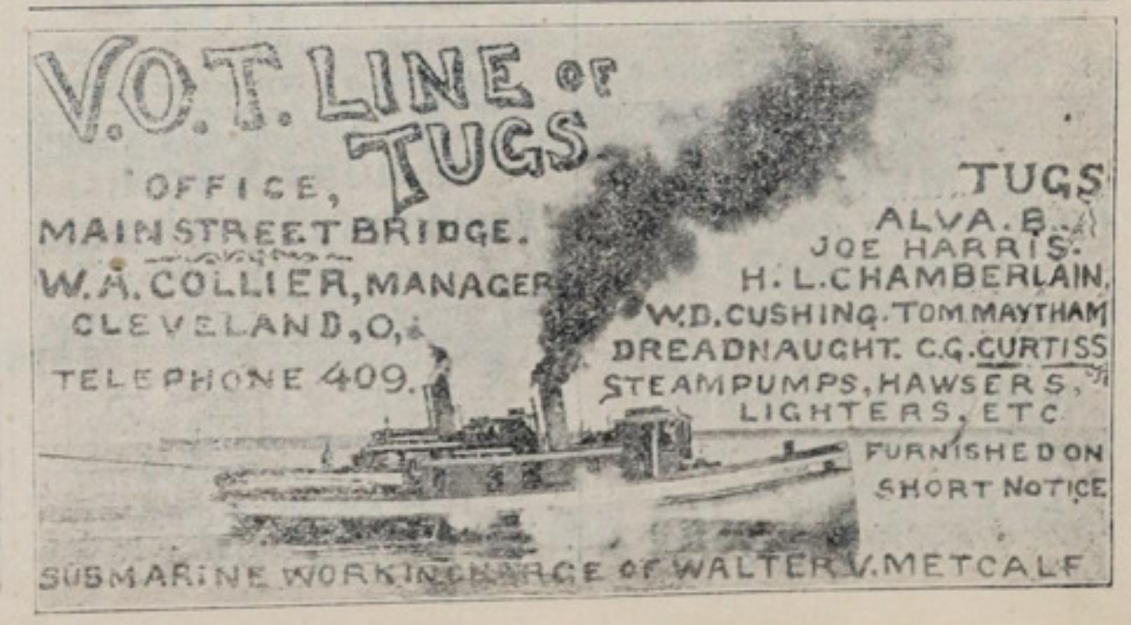

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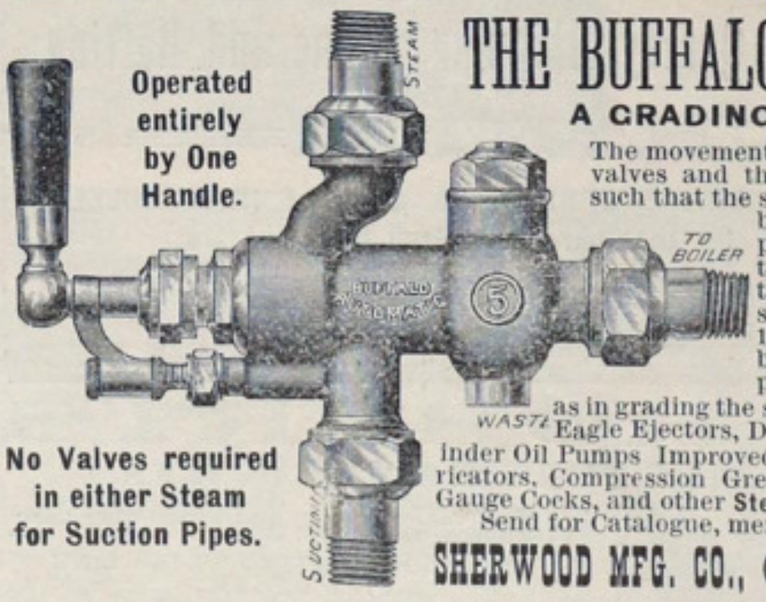

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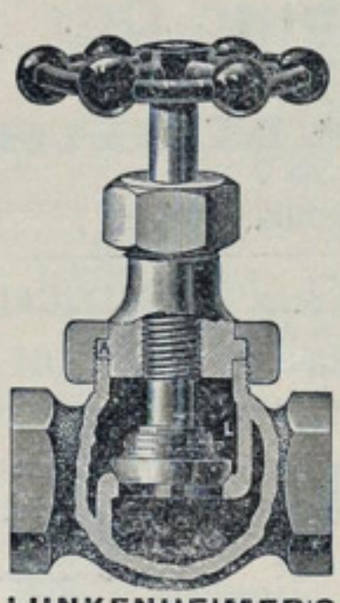

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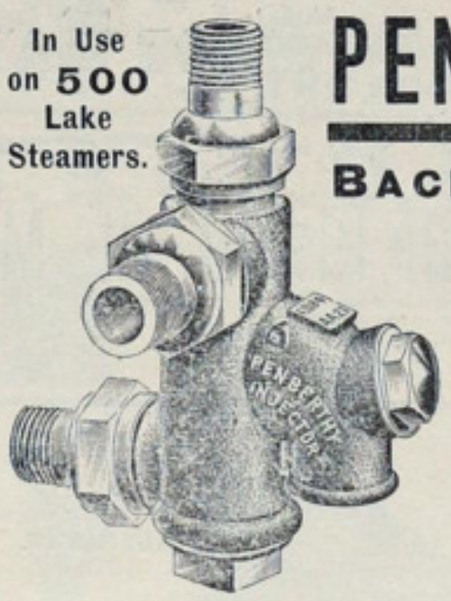

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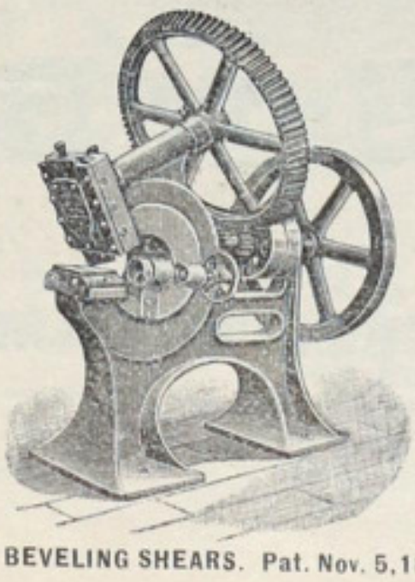

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